

REMARKS

Claims 1-13 and 52-53 are pending.

Claims 1-13 and 52-53 are rejected.

Claim 52 is amended.

The Examiner rejected various groups of claims under either §102 or §103. Applicants address each basis for rejection separately below.

I. Rejection of claims under §102

The Examiner rejected claims 1-4 and 8-13 as being anticipated by Summerfelt (U.S. Pat. No. 6,362,068). Applicants contend the Examiner has failed to meet the burden for a novelty rejection.

Significantly, the Examiner has previously attempted to reject these claims as being anticipated by Summerfelt. (*See* Office Action dated 8/20/04 at p. 3-4.) In response, Applicants addressed the distinctions of the claims from Summerfelt. (*See* Response to the Office Action dated 8/20/04 at p. 5.) Specifically, Applicants highlighted claim 1's limitation that at least two layers (of a plurality of high-K dielectric layers) exhibit different degrees of oxidation. Dependent claims 2-4 benefit accordingly. Claim 8 requires its second high-K capacitor dielectric have a lower oxygen density than the first high-K capacitor dielectric. Dependent claims 9-11 benefit accordingly. Claim 12 requires that the second high-K capacitor dielectric contains an amount of oxygen per unit volume different from the amount per unit volume in the first high-K capacitor dielectric. Claim 13 requires that one of the sub-layers of the dielectric is more oxidized than another sub-layer of the dielectric. Applicants contended such clarifications overcome the Summerfelt novelty rejections.

The Examiner appeared to have agreed with Applicants' contention, as the next Office Action contains no novelty rejection. (*See* Office Action dated 1/25/05.) Despite the resolution of that issue, the Examiner attempts to resurrect a Summerfelt-based novelty rejection in the latest Office Action. In doing so, the Examiner appears to admit that Summerfelt fails to express the limitations addressed above. (Office Action dated 5/4/05 at p. 3.) (Applicants note the Examiner does not use the exact claim language that appears in every claim; Applicants should

not be understood to be acquiescing to limitations perceived by the Examiner that exceed those expressed in any claim.) Nevertheless the Examiner attempts to argue that Summerfelt inherently teaches these limitations. (*Id.*)

Applicants contend the Examiner's announcement is contrary to binding case precedent--*In re Zurko* (258 F.3d 1379, 59 U.S.P.Q.2d 1693 (Fed. Cir. 2001)). In *Zurko*, the Patent and Trademark Office (PTO) rejected Zurko's claims, indicating that at least one of the claim limitations was not explicitly disclosed by the cited art; nevertheless, the PTO announced that such a limitation was inherent. (*See id.* at 1695. A copy of *Zurko* is included in an appendix to this Response.) In reversing the PTO, the Court held that the PTO cannot simply make such conclusions with respect to core factual findings in determining patentability. (*See id.* at 1697.) Rather, the Court required that the PTO "point to some concrete evidence in the record" to support its findings concerning aspects of the relevant technology. (*Id.*)

The current facts are analogous: the Examiner admits that Summerfelt fails to expressly disclose limitations in claims 1-4 and 8-14; but the Examiner argues such limitations are inherent in Summerfelt's express disclosure of "metal-rich dielectric layers." (Office Action dated 5/4/05 at p. 3.) Because that announcement serves as the basis for a novelty rejection, that announcement represents a core factual finding relevant to patentability. Further, while the Examiner purports to rely upon Summerfelt's supposedly express disclosure of "metal-rich dielectric layers," Applicants note there is no citation to specific excerpts of Summerfelt, nor can Applicants find that term (or even the word "rich") in Summerfelt. As a result, the Examiner's announcement is not only a misinterpretation of Summerfelt but also lacks citation to *concrete evidence* in the record. Such makes the Examiner's statement legally improper given the standards of *Zurko* and is tantamount to an invitation for reversal by the Board or by the Court.

Further, the current facts are even more in Applicants' favor than those in *Zurko*. Even if the "metal-rich" nature of Summerfelt's dielectrics were or could be supported, the Examiner has failed to indicate how the bare disclosure of such layers necessarily addresses the claim limitations mentioned above. Specifically, the Examiner has failed to explain how "metal-rich dielectric layers" necessarily require at least two layers of a plurality of high-K dielectric layers exhibiting different degrees of oxidation (claims 1-4); a second high-K capacitor dielectric having a lower oxygen density than a first high-K capacitor dielectric (claims 8-11); a second high-K capacitor dielectric containing an amount of oxygen per unit volume different from the

amount per unit volume in the first high-K capacitor dielectric (claim 12); or one of the sub-layers of a dielectric being more oxidized than another sub-layer of the dielectric (claim 13). As a result, withdrawing this rejection is further justified.

Applicants also note that withdrawing the current Summerfelt-based novelty rejection would have the additional benefit of maintaining consistency with the Examiner's previous withdrawal of a Summerfelt-based novelty rejection.

II. Rejection of claims under §103

The Examiner raised two obviousness rejections which Applicants address separately below.

A. Rejection of claims in light of Summerfelt

The Examiner rejected claims 5-7 as being obvious, citing Summerfelt as the only reference. The Examiner justified the rejections based in part on the arguments applied against claims 1-4 in the attempted novelty rejections. However, as mentioned above in part I, the Examiner's arguments against claims 1-4 are defective in that (1) the Examiner failed to cite concrete evidence in the record supporting the Examiner's interpretation of Summerfelt; (2) Summerfelt itself fails to support the Examiner's interpretation of that reference; and (3) the Examiner's interpretation of Summerfelt's express and inherent teachings fail to address the relevant claim limitations anyway. Applicants further contend the Examiner's additional basis for the §103 rejection of claims 5-7 fail to cure or even address such defects. As a result, the faulty initial basis renders the §103 rejection of claims 5-7 untenable.

Moreover, the Examiner's additional basis for the §103 rejection of claims 5-7 exhibits additional defects, thereby making the §103 rejection of claims 5-7 even more untenable. The Examiner's additional basis begins with an admission that Summerfelt fails to disclose the dielectric thickness limitations of claims 5-7. (Office Action dated 5/4/05 at p. 3.) Nevertheless, the Examiner announces that such limitations are "an obvious matter of design choice," "bounded by well known manufacturing constraints," and "ascertainable by routine experimentation and optimization." (*Id.*) Applicants contend that the Examiner's opinions on

design choices, well known manufacturing constraints, and what is routine experimentation in the art without citation to concrete evidence in the record is once again in conflict with binding case precedent. (*See Zurko*, 59 U.S.P.Q.2d at 1697 (prohibiting the Examiner from simply reaching conclusions based on the Examiner's own understanding or experience concerning what is known in the art and instead requiring the Examiner to point to concrete evidence in record).)

The Examiner then attempts to argue that Applicants have not established that the claim limitations are non-obvious. (Office Action dated 5/4/05 at p. 4.) However, Applicants remind the Examiner that the initial burden is not on Applicants to establish non-obviousness; rather, the Examiner has the initial burden to establish *prima facie* obviousness. (*In re Rijckaert*, 9 F.3d 1531, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). A copy of the case is included in an appendix to this Amendment.) Applicants contend that the Examiner's baseless opinions concerning Summerfelt's inherent teachings and the state of the art in general fail to satisfy that burden.

Nevertheless, Applicants contend non-obviousness is established by Summerfelt – the very reference the Examiner attempts to rely upon. In fact, an analysis of Summerfelt demonstrates that the Examiner has once again misinterpreted that reference. Specifically, in rejecting claims 5-7, the Examiner only went so far as to admit that Summerfelt fails to disclose their thickness limitations. (Office Action dated 5/4/05 at p. 3.) However, Applicants contend Summerfelt goes further and actively teaches away from the limitations. Claim 5, for example, limits its plurality of high-K dielectric layers to defining a thickness of at most 200 angstroms. Summerfelt, on the other hand, discloses a strontium titanate/barium strontium titanate/strontium titanate dielectric stack that is 1000 angstroms thick. (Summerfelt at col. 3, ln. 39-42 (disclosing a stack that is “100 nm,” wherein 1 angstrom=0.1 nanometers).) Summerfelt subsequently discloses a barium strontium titanate film that is itself 1000 angstroms thick. (*See id.* at ln. 58.) Moreover, Summerfelt warns that thinner dielectrics substantially lower the dielectric constant (*id.* at col. 3, ln. 59-62) while touting the need in the industry for high dielectric constant (*id.* at col. 1, ln. 21-24). Thus, Summerfelt's (1) specifying a dielectric stack that is five times the thickness allowed for in claim 5; and (2) warning against thin dielectric stacks by (3) suggesting that such bucks the desired trend toward high-k discourage an ordinary artisan from the limitation in claim 5 directed to a relatively thin plurality of dielectric layers. Dependent claims 6-7 benefit accordingly.

The Examiner also cited case precedent in an attempt to justify the rejections. (Office Action dated 5/4/05 at p. 4.) However, none of those cases appear to address the current situation, where the cited reference diametrically opposes the claimed invention. At best, the cases' prior art appeared to be silent concerning the relevant claim limits. In **Rose**, for example, the Court acknowledged that the prior art disclosed lumber packages that "can" be lifted by hand; but neither the Court nor the appellant indicated that such art teaches away from the relevant claim limitation of a lumber package sized to require lifting by truck. (*In re Rose*, 220 F.2d 459, 105 U.S.P.Q. 237, 240 (C.C.P.A. 1955).) In **Rinehart**, the Court expressed that there was nothing to indicate the prior art processes were ineffective on the commercial scale required by the claim at issue. (*In re Rinehart*, 531 F.2d 1048, 189 U.S.P.Q. 143, 148 (C.C.P.A. 1976).) In **Gardner**, the patentee attempted to distinguish from the prior art by arguing that such art "does not specify" the claimed dimension. (*Gardner v. TEC Sys.*, 725 F.2d 1338, 220 U.S.P.Q. 777, 785 (C.A.F.C. 1984).) In **Dailey**, the applicant attempted to address the prior art by arguing such art was "devoid of any suggestion" concerning the claimed dimension. (*In re Dailey*, 357 F.2d 669, 149 U.S.P.Q. 47, 49 (C.C.P.A. 1966).) Thus, assuming *arguendo* that the case precedent supports the Examiner's statement of the law, those cases are distinguished from the current facts, and the Examiner's proposition is therefore inapplicable.

Applicants note the Examiner has previously cited this string of cases to justify an obviousness rejection based on a single reference. (Office Action dated 8/20/04 at p. 5 (citing Horiike – U.S.Pat. No. 5,290,609).) Applicants made a similar counter argument in the Response to the Office Action dated 8/20/04 (at p. 7), pointing out that Horiike actively teaches away from the rejected claims; and the rejection was withdrawn. Applicants submit the current rejection should be withdrawn similarly.

Further support for withdrawing the rejections stems from further distinction of the current facts from those in the Examiner's cases. Specifically, claims 5-7 contain more than dimensional limitations distinguishing themselves from Summerfelt. Namely, those claims also incorporate claim 1's limitation directed to at least two layers of a plurality of high-K dielectric layers exhibiting different degrees of oxidation. Applicants established above in part I that Summerfelt fails to expressly or inherently disclose such a limitation. The Examiner's citations to **Rose**, **Rinehart**, **Gardner**, and **Dailey** do not address that failure.

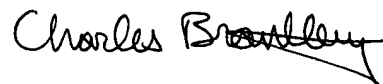
B. Rejection of claims in light of Hirota

The Examiner rejected claims 52-53 as being obvious, citing Hirota (U.S. Pat. No. 6,228,702) as the only reference. Applicants have clarified claim 52 to indicate that at least one layer of the plurality of capacitor dielectric layers manifests greater oxidation than would an equal thickness of an underlying layer of that plurality. Hirota, on the other hand, forms its underlying dielectric at a higher pressure and with more oxygen to provide better physical properties than its overlying dielectric. (See Hirota at Abstract; col. 7, ln. 64-col. 8, ln. 13; col. 16, ln. 13-34.) Such suggests that Hirota actually teaches away from the clarification and supports the non-obviousness of claim 52. Dependent claim 53 benefits accordingly.

Conclusion

In light of the above amendments and remarks, Applicants submit that the claims are allowable over the applied references. Therefore, Applicants respectfully request reconsideration of the Examiner's rejections and further requests allowance of all of the pending claims. If there are any matters which may be resolved or clarified through a telephone interview, the Examiner is requested to contact Applicants' undersigned attorney at the number indicated.

Respectfully submitted,



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